March 10, 1936. O. M. OTTE 2,033,861

REFRIGERATOR SHELVING

Filed July 16, 1932 4 Sheets-Sheet 1

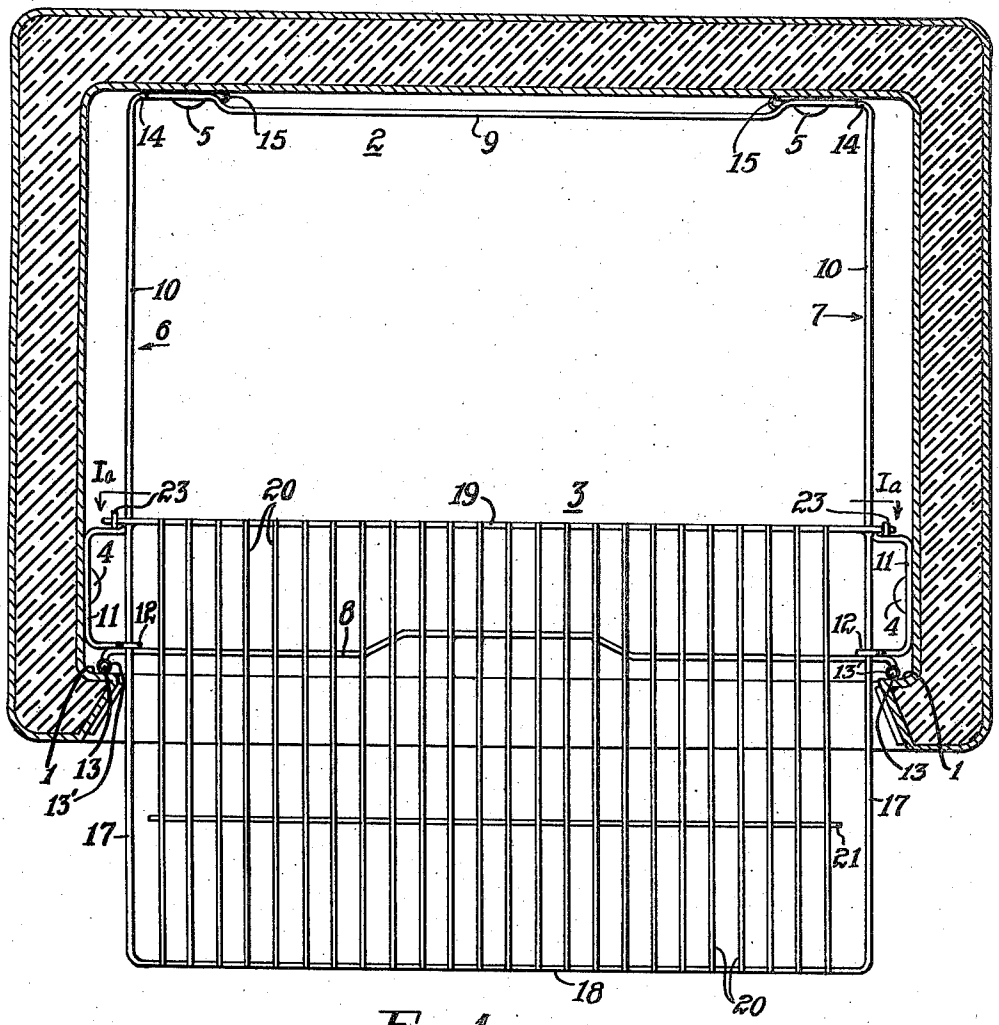

Fig. 1.

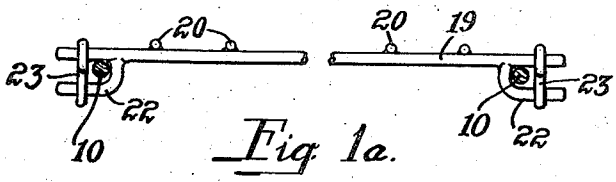

Fig. 1a.

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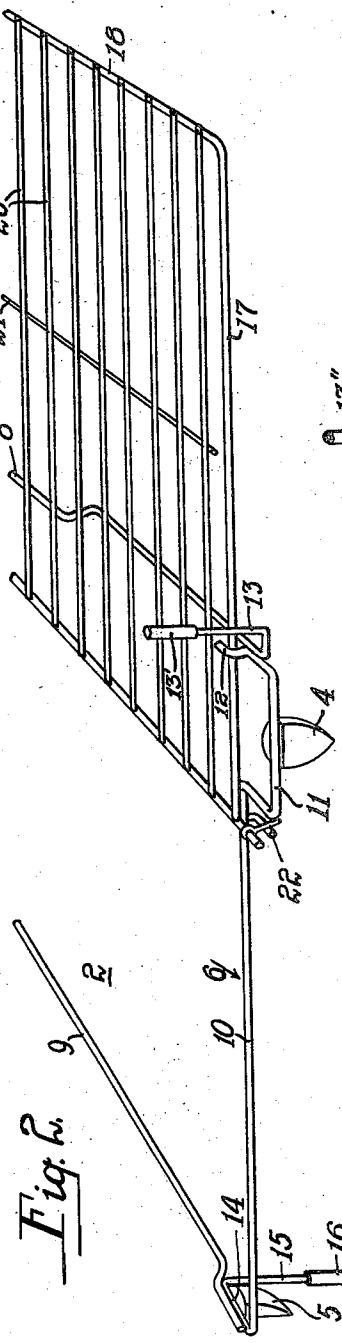

Fig. 2.

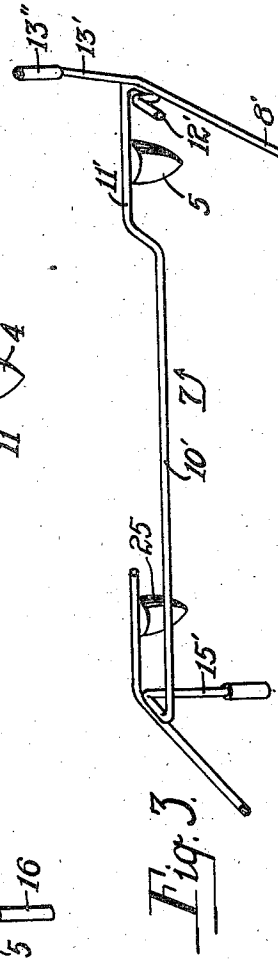

Fig. 3.

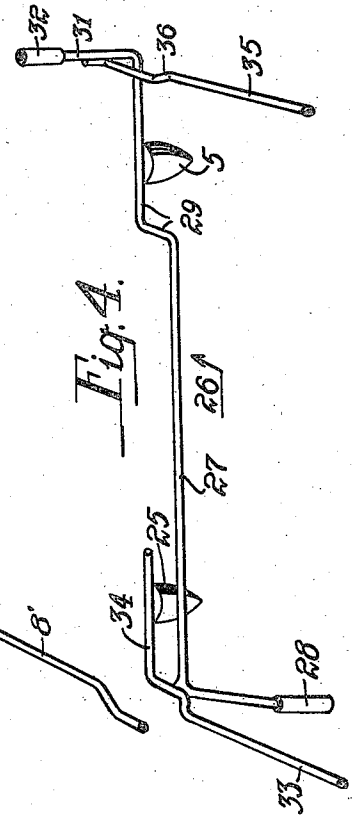

Fig. 4.

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REFRIGERATOR SHELVING

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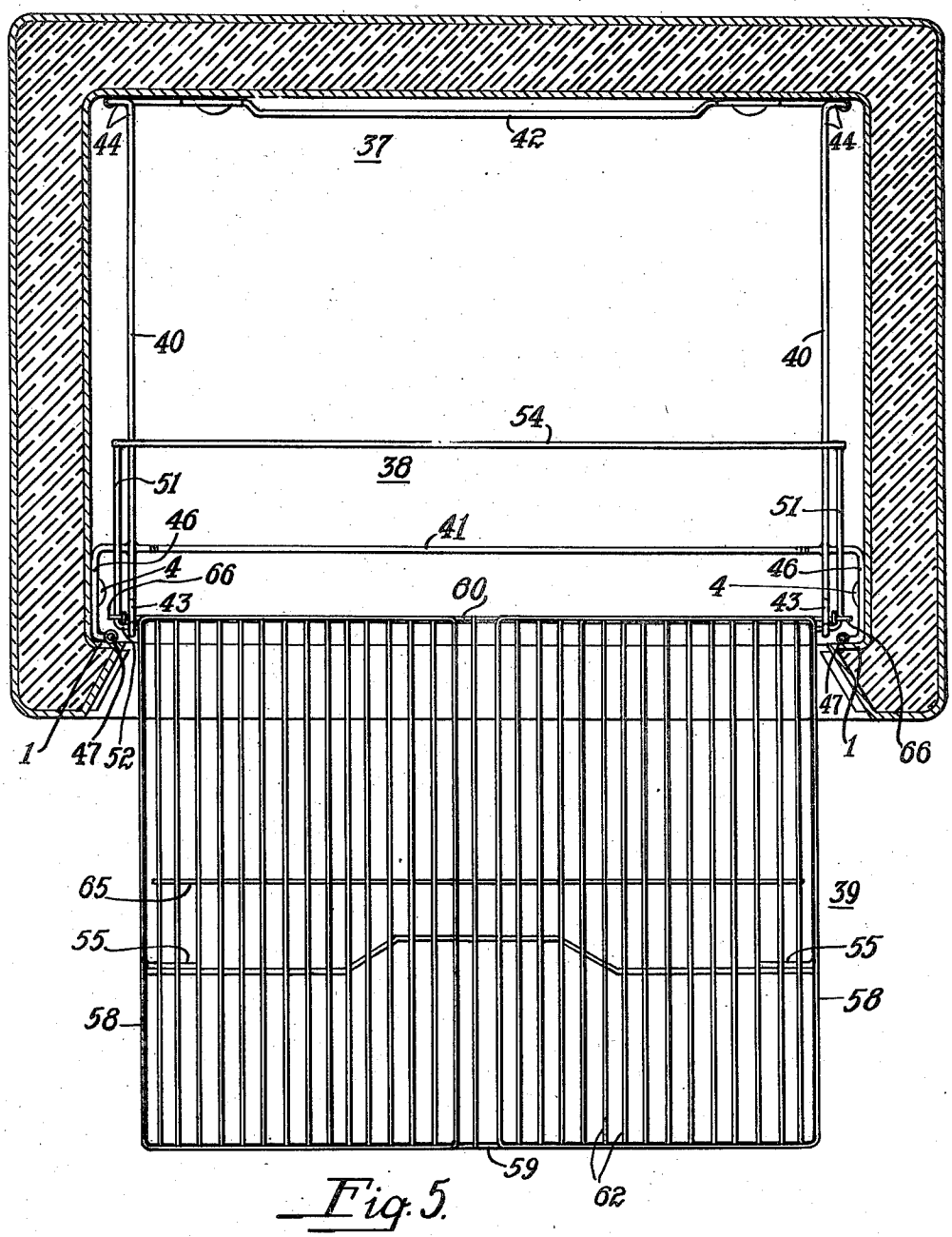

Fig. 5.

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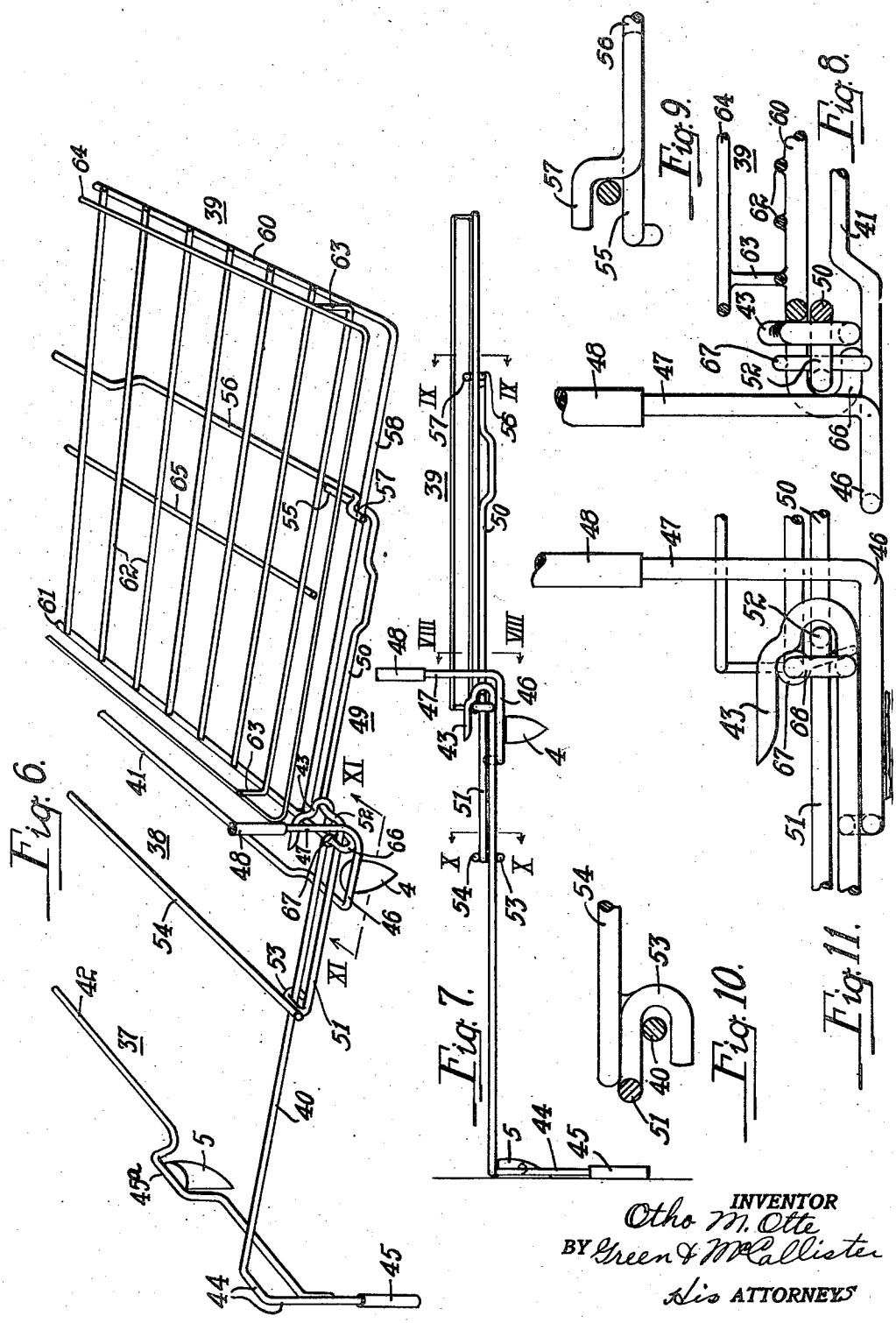

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 11.

Fig. 10.

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Patented Mar. 10, 1936

2,033,861

UNITED STATES PATENT OFFICE

2,033,861

REFRIGERATOR SHELVING

Otho M. Otte, Tarentum, Pa., assignor, by mesne assignments, to General Electric Company, a corporation of New York

Application July 16, 1932, Serial No. 622,866

9 Claims. (Cl. 211—143)

This invention relates to compartments such as refrigerator cabinets and more particularly to shelving designed to permit either partial or full extension of the provision shelves with reference to the provision compartments thereof.

An object of this invention is the provision of shelving of the character referred to above, that shall be simple in construction, inexpensive to manufacture, efficient, quiet, and positive in operation.

Another object of the invention is the provision of extension shelving of the type referred to above that may be made as an accessory for refrigerator cabinets or other compartments now in service, or as standard equipment for such compartments.

Other objects of the invention will, in part, be apparent and will, in part, be obvious to those skilled in this art, with an understanding of the invention as gathered from the following specification taken in conjunction with the accompanying drawings in which—

Figure 1 is a view in horizontal section through a refrigerator, with the door removed, showing extension shelving embodying one form of the invention with the provision shelf in extended position;

Fig. 1*a* is a fragmentary view in section taken on lines I*a*—I*a* of Fig. 1 showing the method of mounting the rear end of the provision shelf on the support frame;

Fig. 2 is a fragmentary view, in perspective, of the provision shelf and the support frame;

Fig. 3 is a fragmentary view in perspective, showing the form and the construction of a modified form of support frame;

Fig. 4 is a view similar to Fig. 3 showing a still further modified form of support frame;

Fig. 5 is a view similar to Fig. 1 showing extension shelving embodying a modified form of the invention, with the provision shelf fully extended through the door opening;

Fig. 6 is a partial view in perspective, showing the stationary support frame, the movable or intermediate support frame, and the provision shelf of Fig. 5;

Fig. 7 is a view in side elevation of the shelving illustrated in Fig. 6;

Fig. 8 is a partial enlarged view, in section, taken on line VIII—VIII of Fig. 7 showing the form and construction of one side of the shelving, it being understood that the other or opposite side is of similar construction;

Fig. 9 is an enlarged view in section taken on line IX—IX of Fig. 7 of one side of the provision shelf showing the method of mounting the shelf on the forward end of the movable or intermediate support frame;

Fig. 10 is an enlarged view in section, taken on line X—X of Fig. 7, through one side of the stationary and movable support frame; and

Fig. 11 is a fragmentary, enlarged view, in side elevation, of a portion of the shelving shown in Fig. 6 as seen looking in the direction of arrows XI—XI.

Throughout the specification and the drawings, like reference characters indicate like parts.

In the drawings, two forms of shelving, embodying the invention, are illustrated. In the form shown in Figs. 1 and 2, inclusive, the provision shelf is adapted for partial extension, that is, the provision shelf may be extended approximately one-half or more of its length through the door opening of the refrigerator.

In the other form, illustrated in Figs. 5 to 11, inclusive, the provision shelf is adapted for approximately full extension through the door opening.

Partial extension, as provided by the form shown in Figs. 1 and 2, is sufficient for the ordinary household refrigerator having a provision compartment of average depth, that is, as measured from front to back.

The form illustrated in Figs. 5 to 11, which is designed to give full extension of the provision shelf, could, obviously, be used in the aforementioned average household refrigerator, but this is more advantageous with refrigerators requiring close spacing of the shelves, and having a provision compartment of more than average depth as measured from front to back.

In the drawings, (Figs. 1 and 5) both forms of shelving are illustrated in conjunction with refrigerators of the same depth, in order to show by comparison the actual extension that each provides. However, it is to be understood that the relative advantages of one over the other, in regard to the particular applications mentioned above, are appreciated and contemplated herein.

The shelving shown herein, is specially designed for use in refrigerators in which side walls are inturned to provide front wall projections or nubbins 1 which, in effect, form the frame for the door opening. These projections therefore make the door opening narrower than the width of the refrigerator compartment. It is thus apparent that the provision shelves must be slightly narrower than the door opening in order that they may pass therethrough, and consequently

the support frames must be designed to carry the provision shelves in such manner as to permit movement therethrough.

The extension or slide-away shelf illustrated in Figs. 1 and 2, comprises two major parts, a support frame 2, and a provision shelf 3 slidably mounted on the frame. The support frame is carried fore and aft by nubbins or projections 4 and 5 formed on side walls and back wall respectively, of the refrigerator.

The support frame 2 is made from rod or wire and comprises side rails 6 and 7 running parallel to the refrigerator side walls, connected fore and aft by end members or rods 8 and 9. The distance between major portions 10 of the side rails 6 and 7 is slightly less than the width of the door opening, so that the rear end of the provision shelf may be slidably mounted thereon. As shown, the major portions 10 of the side rails are spaced from the side walls. The forward ends of the side rails have outwardly projecting portions or bends 11 of U-shape that engage the side walls of the refrigerator and rest or bear on the nubbins or projections 4. The extreme forward ends of the side rails are bent upwardly as at 12 so as to overhang the sides of the provision shelf and thereby prevent accidental upward tilting thereof in the operation of moving the shelf into or out of the compartment. It will also be noted (see Figs. 1 and 2) that the upwardly bent forward ends 12 of the side rails serve as an upper guide and as a side support for the major side portions 17 of the slidable shelf.

End member or cross rod 8 extends across the door opening and is welded or otherwise secured to the forward ends of the support frame side rails. The extreme ends of member 8 are bent upwardly to provide anchor arms 13, provided with sleeves 13', of yieldable material, such as rubber. Sleeves 13' bear against the ledges or inturned wall portions 1 of the refrigerator which, with arms 13, prevent tilting of the shelf and the support frame when the shelf is extended as in Fig. 1.

The middle portion of cross rod or end member 8 may be bent rearwardly so that the forward ends of the shelf may be grasped, in the act of extending the same, without also grasping the cross rod.

The rear ends of the side rails 6 and 7 may be bent inwardly at right angles as at 14, and downwardly at right angles to form anchor arms 15. Both portions 14 and arms 15, lie parallel to the refrigerator back wall.

The downwardly extending arms 15 may be provided with sleeves 16 of yieldable material as rubber, which bear against the back wall and resist upward tilting of the support frame and necessarily prevent downward tilting of the forward end of the provision shelf.

The rear cross member 9 is attached to the portions 14 of the side rails as by welding, and the body thereof may be bent inwardly from the back wall so as to be spaced therefrom. The portions 14 of the side rails rest on the nubbins or projections 5 on which the rear part of the support frame is carried.

Since the downwardly extending arms 15 are disposed on the inside faces of nubbins 5 and bear snugly thereagainst it is apparent that the rear end of the support frame will be held positively and firmly in operative position. Also, since the U-bends 11, at the forward ends of the side rails, bear snugly against the refrigerator side walls, it will be apparent that the forward end of the support frame is also held positively and firmly in operative position.

The provision shelf 3 comprises side rails 17, a front connecting rod or member 18, preferably made as an integral unit with the side rails, from round rod or wire of rustless iron or stainless steel, and a rear connecting bar or rod 19 welded to the ends of the provision shelf side rails. The ends of the connecting rod 19 overhang or extend across the support frame side rails and slidably support the rear end of the provision shelf thereon. The provision shelf includes floor rods 20, which extend longitudinally of the shelf and are welded to the front and rear cross members or rods. To strengthen or rigidify the floor members, a cross rod 21 may be welded to the underside of the rods as shown.

To prevent upward tilting of the rear end of the provision shelf when extended, L-shaped members 22 are welded or otherwise secured to the shelf rails 17. These members are disposed on the inside of and extend under the support frame side rails thereby holding the rear end of the provision shelf in alignment with respect to the support frame side rails and limit the upward tilting thereof.

When the provision shelf is mounted in position on the support frame, the rear end of the shelf is carried by the support frame side rails and the forward part thereof is carried by the cross member 8. Thus as the shelf is moved to extended or to retracted position, with respect to the refrigerator compartment, the shelf slides on the side rails and the front cross bar of the support frame.

In order to limit the outward movement of the provision shelf, in the operation of extending the same, pins 23 are provided and hinged at the ends of the rear cross member 19. These pins normally hang downwardly and rest against the forward sides of the L-shaped members 22, so that they strike the innermost legs of the U-bends 11, in the support frame side rails when the shelf is moved to the limit of its extended position. The pins 23 in conjunction with the ends of cross member 19 and the L-shaped members 22 form in effect closed loops through which the support frame side rails extend.

To remove the shelving of Figs. 1 and 2 from a refrigerator compartment, for cleaning, the shelf is moved to retracted position, the forward end of the support frame lifted upwardly so that it may be lifted off the support nubbins 4 and 5, tilted at an angle and then removed from the compartment through the door opening.

To disengage the shelf from the frame, the pins 23 are raised up so that the shelf may be pulled forward to a position such that the rear cross member 19 is within the U-bends 11. The rear end of the frame being narrower than the distance between the U-bends, the rear end of the shelf may be disengaged from the support frame, thus permitting the side rails of the shelf to be disengaged from the front cross member 8 and the overhanging portions 12 of the support frame side rails.

In some types of refrigerators, the wall support nubbins may be provided only on the side walls. In such cases, a support frame such as shown, in Fig. 3, or in Fig. 4 may be utilized in place of the support frame illustrated in Figs. 1 and 2.

In Fig. 3, the side rails and the front connecting member are of substantially the same shape

and form as the corresponding members of the support frame shown in Figs. 1 and 2. These members will, therefore, be designated by the same reference characters primed. This support-frame differs primarily in the construction of the rear cross member. As shown the ends of the cross member are extended beyond the major portions 10' of the side rails and are bent forwardly and parallel to the side walls, so as to provide a support to engage the rear nubbins 25.

The support frame shown in Fig. 4 comprises side rails 26 (only one of which is shown) having major portions 27 on which the provision shelf may slide. The rear end of each side rail is bent downwardly at an angle and provided with a sleeve 28 of rubber or other yieldable material adapted to engage the rear wall of the compartment to prevent upward tilting of the rear end of the support frame. The forward end of the side rail has a right angle bend 29 therein which forms a support to engage the forward nubbins 5 on the side walls of the compartment.

The extreme forward end of the side rail is bent upwardly at right angles to form an anchor arm 31 on which is placed a sleeve 32 of rubber or other yieldable material adapted to engage ledges or projections 1 of the side walls. The rear ends of the side rails are connected by a cross member 33 having L-shaped ends 34 (only one of which is shown), adapted to engage the rear nubbins on the refrigerator side walls and thereby support the rear end of the support frame. The portion of the rear connecting rod between the side rails may be bent backwardly so as to engage the back wall of the refrigerator.

The forward ends of the side rails are connected by a rod or member 35 welded to the upwardly extending portions 31 of the side rails. The portions of the front cross member lying between the major portions 27 of the side rails, are bent downwardly at 36 to provide a support for the forward end of the provision shelf. The side rails 17 of the provision shelf will slide on cross rod 35 and between the right angle bends 36 of the front cross member, so that the forward end of the provision shelf will be guided and held in alignment with the rear end thereof which slides on the major portion 27 of the support frame side rails.

The shelving illustrated in Figs. 5 to 11, inclusive, is, as stated previously herein, adapted for full extension of the provision shelf. The shelving illustrated in these figures comprises three main parts, a stationary support frame 37, which is mounted on nubbins 4 and 5, such as shown in Fig. 1, an intermediate and movable support frame 38 slidably mounted on the stationary support frame, and a provision shelf 39 slidably mounted on the intermediate support frame.

The stationary support frame comprises side rails 40 connected at their forward and rear ends respectively by cross members 41 and 42. As may be seen in Figs. 6 and 7, the forward ends of the side rails terminate in rearwardly extending hooks 43 and the rear ends 44 thereof are bent in the form of an L. The L ends 44 extend at right angles to the side rails towards the side walls of the compartment and the long legs of each L extend downwardly. The long leg of the L may be provided with a sleeve 45 of yieldable material such as rubber, adapted to bear against the rear wall of the compartment and thus prevent upward tilting of the rear end of the stationary support frame. The rear connecting member of the support frame is joined at its ends to the depending legs of the portion 44. The portions of the rear member passing over the support nubbins 5 are formed with inverted U-bends 45a which serve to maintain the rear end of the support frame in its intended operative position.

The front cross member 41 may be secured to the under side of the support frame side rails at a distance behind the hooks 43 of the rails. The ends of the cross member are given a U-bend 46 to provide a portion adapted to lie on nubbins 4 and an upward right-angle bend to provide anchor arms 47 that engage ledges 1 of the side walls and thereby prevent upward tilting of the rear end of the stationary support frame. Arms 47 may be fitted with sleeves 48 of yieldable material, as rubber, to provide yielding contact between the arms and ledges.

The intermediate support frame 38 comprises side rails 49 having front and rear sections 50 and 51 the front sections of each rail being offset inwardly of the rear sections and connected by a portion 52 that extends crosswise of the stationary support frame side rails and slides thereon. Thus the front portions 50 run on the inside of the stationary support frame hooks 43 and the rear portions 51 on the outside thereof. When the movable or intermediate support frame is extended to its outward limit, the connecting portions 52 of the side rails engage the hooks 43 of the stationary support frame. The hooks 43 and the portions 52 thus act as stops to limit outward movement of the intermediate support frame.

The rear ends of the movable support frame side rails are formed with inwardly extending hooks 53 that partially embrace the stationary support frame side rails so as to prevent tipping up of the rear end of the movable frame as it slides to and from extended position. To maintain the rear ends of the side rails in operative position, a cross rod 54 is attached thereto, as by welding or brazing.

The forward ends of the movable support frame side rails may be bent inwardly to provide support arms 55 on which the forward part of the provision shelf 39 may slide. To rigidify and hold the forward ends of the intermediate support frame side rails in position, a front cross member 56 is provided and welded or otherwise secured to support arms 55. The extreme ends of the cross member may be bent upwardly, as at 57 so as to overhang the sides of the provision shelf to prevent accidental upward tilting thereof.

The provision shelf comprises side rails 58 and 59 connected at their front ends by means of a cross bar 60, preferably made integral therewith, and a rear connecting bar 61 welded to the ends of the shelf side rails. The shelf also includes longitudinally extending floor rods 62 the ends of which may be welded to the front and rear members thereof. Certain of the floor rods may be made longer than others, so that the ends thereof may be bent upwardly to form supports 63 on which a guard or fence rail 64 may be attached to prevent provisions placed on the shelf from falling or slipping off the edges thereof. The floor rods may be braced, if desired, by means of a cross member 65 placed underneath the same and welded or otherwise secured thereto.

The rear connecting member or cross rod 61 is made longer than the width of the provision

shelf so that hooks 66 may be formed at the ends thereof to partially embrace rear portions 51 respectively, of the intermediate support frame side rails. In order to limit the forward movement of the provision shelf, pins 67 are pivotally mounted on the rear cross member and normally hang downward so as to bear on the forward sides of hook portions 66. Thus as the frame is moved forward the pins engage connecting portions 52 which join the forward and rear portions of the intermediate support frame side rails and thereby stop or limit the forward movement of the provision shelf with respect to the intermediate support frame.

In order to remove the full extension type shelving illustrated by Figs. 5 to 11 inclusive, the provision shelf and the intermediate support frame are moved to their retracted positions so that all three units may be removed as a whole from the refrigerator compartment in substantially the same manner in which the shelving described in connection with Figs. 1 to 4 inclusive is removed. After removal of the unit, the intermediate support frame and the provision shelf are removed as a unit from the stationary support frame. After the removal of these members from the stationary support frame, the pins 67 are swung upwardly so that, as the provision shelf is moved forwardly, these pins will clear the connecting portions 52. After these pins clear the connecting portions, the shelf may be detached from the intermediate support frame by merely pulling it rearwardly until the forward end of the provision shelf passes from under the overhanging portions 57 of the front connecting member 56.

While two forms of the invention have been shown and described herein, it will be apparent to those skilled in this particular art that various modifications and changes may be made without departing either from the spirit or the scope of the invention. It is desired, therefore, that only such limitations shall be placed on the invention as are imposed by the prior art and the appended claims.

What I claim as new and desire to secure by Letters Patent is:—

1. Extension shelving for compartments comprising a support frame having side rails connected fore and aft by cross members, said frame being adapted for mounting on projections or nubbins formed on the walls of a compartment, said frame having downwardly extending anchor arms at the rear end thereof adapted to contact with the rear wall of the compartment to prevent upward tilting of the rear end of said frame, and a provision shelf slidably mounted on the support frame, said shelf comprising side rails connected fore and aft by cross members, the rear cross member of the shelf terminating in loops embracing the support frame side rails to provide non-tilting sliding engagement between the rear end of the shelf and the support frame side rails, the forward end of the shelf being slidably mounted on the front cross member of the support frame, the front cross member of said support frame having portions overhanging the shelf side rails to prevent accidental upward tilting of the front end of the shelf.

2. Extension shelving for compartments comprising a support frame having side rails connected fore and aft by cross members, said frame being adapted for mounting on projections or nubbins formed on the walls of a compartment, said frame having downwardly extending anchor arms at the rear end thereof adapted to contact with the rear wall of the compartment and upwardly extending anchor arms at the forward end thereof adapted to engage the front wall of said compartment, said anchor arms preventing tilting of the support frame, and a provision shelf slidably mounted on the support frame, said shelf comprising side rails connected fore and aft by cross members, the rear connecting member terminating in loops embracing the support frame side rails to provide non-tilting sliding engagement between the rear end of the shelf and the support frame side rails, the forward end of the shelf being slidably mounted on the front cross member of the support frame, the front cross member of said support frame having portions overhanging the shelf side rails to prevent accidental upward tilting of the front end of the shelf.

3. Extension shelving for a compartment including a support frame having side rails connected by at least one transverse member, said frame having extending portions of wire form for mounting on projections from walls of a provision compartment of the refrigerator, the extending portions of said frame having downwardly extending anchor arms of wire form, said anchor arms extending parallel to and in abutment with an adjacent wall of the provision compartment for preventing tilting of the rear end of said frame, and a shelf slidably mounted on said support frame.

4. Extension shelving for a compartment including a support frame having side rails connected by at least one transverse member, said frame having extending portions for mounting on projections from walls of a provision compartment of the refrigerator, said frame having downwardly extending anchor arms at the rear end thereof adapted to contact a rear wall of the provision compartment and having upwardly extending anchor arms at the forward end thereof adapted to contact a front wall of the compartment, so that said anchor arms may prevent an up and a down tilt of the support frame, and a provision shelf slidably mounted on the support frame, said provision shelf having a means for slidably holding said shelf upon the side rails of said support frame.

5. In a compartment having a plurality of support nubbins incorporated in its wall make-up, the combination of a sliding shelf structure of wire form, said structure including a support frame of wire form and a shelf of wire form slidably mounted thereon, said support frame having side and rear rods, the side rods of said support frame being spaced from side walls of the compartment, said side and rear rods having extending rod portions for resting upon the nubbins of said compartment, said extending portions including portions projecting at right angles to each other along and parallel to the compartment walls for preventing a tilting of said support member about the projections of the compartment.

6. In a compartment having projecting support elements incorporated in its wall make-up, the combination of a sliding shelf structure, said structure including a support frame and a shelf slidably mounted thereon, said support frame having suitable side and rear members, the rear member having portions projecting therefrom for cooperating with the support elements on a back wall of the compartment, the side members of said support frame having projecting portions for cooperating with the support elements on side walls

of said compartment, the projecting portions of the side and rear members of said support frame being bent in such a manner that the main body portions of said members will be spaced from the walls of said compartment, the projecting portions of the side and rear members having portions extending substantially at right angles with respect to each other and parallel to the compartment walls, so that said right angle portions will positively anchor the support frame and prevent any up and down tilting of said frame with respect to said compartment.

7. In a compartment having projecting support elements incorporated in its wall make-up, the combination of a sliding shelf structure which includes a support frame and a shelf slidably mounted thereon, said support frame having a rear transverse bar and oppositely-positioned longitudinal side bars, said rear bar having at each end thereof a projecting portion adapted to cooperate with the support elements on a wall of the compartment, the ends of the side bars adjacent the rear bar extending at right angles to said projecting portion of the rear bar and extending parallel to the back wall of the compartment, so that said support frame will be prevented from tilting with respect to the rear support elements of the compartment, said side bars having projecting portions adapted to cooperate with the support elements on sides of the compartment, each of said side bars also having projecting portions extending upwardly at an angle to said first-mentioned projecting portions of said side bars for guiding said shelf in its movement.

8. In a compartment having suitable side walls, a plurality of support nubbins securely mounted on the walls of the compartment, a sliding shelf structure of wire form, said structure including a support frame and a shelf slidably mounted thereon, said support frame having a side and rear rod structure, rod portions extending outwardly from said rod structure towards adjacent nubbins, at least one of said rod portions including mount portions extending at substantial right angles to each other, one of said mount portions extending in one direction along an adjacent wall of the compartment to rest upon one of said support nubbins, another of said mount portions extending in another direction along and substantially parallel to an adjacent wall of the compartment, so that said mount portions will prevent a tilt of the support frame with respect to walls of the compartment, the said extending portions of said rod structure being bent in such a manner that the main body portion of the structure extends substantially parallel to but in a spaced relation with respect to adjacent walls of the compartment.

9. In a sliding shelf structure, the combination of a shelf support member having side bars and a shelf member slidably mounted thereon, said shelf member adjacent the rear thereof having an open loop portion adapted to fit over a side bar of said shelf support member, the side bar of said shelf support member adjacent the front end thereof having a U-shaped portion projecting in the direction of the opening of said loop portion of the shelf member, so that said shelf member may be slid thereto and be removed from said support member, said U-shaped portion being adapted to rest upon support nubbins of a compartment within which the structure is to be mounted, rod means extending outwardly from said side bars adjacent the other end thereof and being bent to extend parallel to and in substantial abutment with adjacent walls of the compartment, said rod portions being adapted to rest upon adjacent nubbins of the compartment.

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